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THE GROWTH OF THE CHILD'S MIND

BY

MARGARET E. SCHALLENBERGER

McNaught

UNIV. OF CALIFORNIA

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THE GROWTH OF THE CHILD'S MIND

We are accustomed today to take the theory of evolution for granted and to apply its method in the study, not only of all the sciences, but in politics, history, education, ethics and religion. We use the word, therefore, as a sort of tag or symbol for that which accounts for any series of changing forms conditioned by definite unchanging laws. Nor are we always so accurate as this. We do not question often the validity of the laws and sometimes are not even certain of their existence; and so we frequently speak of evolution when our meaning is simply change.

That such a loose use of the word is inadmissible in dealing with questions of science is evident. What, then, does the man of science mean by evolution?

Perhaps no greater tribute is paid to the epoch-making theory of Charles Darwin than the fact that the words 'evolution' as used in biology and 'Darwinism' have come to mean practically one and the same thing. The doctrine of evolution and the doctrine of the origin of species are synonymous. The theory of natural selection, by giving a simple, clear and adequate solution of all legitimate problems brought to it, has been accepted by men of science as *the* theory of evolution, and, in less than half a century, has crowded all other theories of organic development so completely to the wall that they have not only ceased to struggle for existence as opposed theories, but in dying have bequeathed to their rival all claim and title to the name evolution. Evolution, then, as applied to organic nature, is the doctrine that explains by the laws of heredity, variation, and natural selection the changes by means of which all forms of life can trace their origin to a common ancestor.

"It is interesting * * * to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse: a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less improved forms."*

But while we use the term *evolution* in this larger sense to denote the changes in forms of life in general, we also apply it in a narrower sense to the changes which take place in the individual in passing from the simple, homogeneous, microscopic cell or germ to the complex, differentiated condition of adult life. The former process is sometimes spoken of as phylogenesis, while this latter is called ontogenesis. Strictly speaking, however, this is not permissible. The tendency at present in scientific writing is to restrict the use of the word evolution to "the continued production of life in accordance with the theory of Descent,"† and to call the series of changes undergone in the life of an individual *development.*

Taking the theory of evolution, then, for granted, let us ask what Darwin meant by *mental* evolution.

I. Did he treat mind as a variation that came in somewhere,—we know not where,—and that proving useful to the organism, was preserved by natural selection, or did he posit mind from the first, synchronous with life?

II. Did he believe that mind like body was subject to change through modifications?

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*"Origin of Species," sixth ed., pp. 504-505.

†"Dictionary of Philosophy and Psychology," edited by J. M. Baldwin, Vol. I.

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III. If so, did he attempt to show any connection between changing bodily structure or function and mentality?

IV. If he did, what was the nature of this connection?

We must not forget that because the world after the publication of the "Origin of Species" in 1859 became intensely interested in the theory of evolution, largely because of its bearing upon the geneology of man, that this was by no means true of Darwin himself. "The Descent of Man" and the "Expression of the Emotions" in Man and Animals were not published until 1871, twelve and thirteen years after the appearance of the "Origin of Species." Undoubtedly Darwin's interest in human beings was largely the result of the heated discussion aroused by the theory of man's ancestry as incidentally stated in the "Origin of Species." But that at first this interest is a secondary one is shown not only in the book itself where specific references to the origin of man *per se* are few and brief, but in statements made elsewhere.

In a letter to Lyell written Jan. 10, 1862, he says, "I shall be truly glad to read carefully any MS. on man, and give my opinion. You used to caution me to be cautious about man. I suspect I shall have to return the caution a hundred fold. Yours will no doubt be a grand discussion; but it will horrify the world at first more than my whole volume; although by the sentence (p. 489 new edition) I show that I believe man is in the same predicament with the other animals. It is in fact impossible to doubt it. *I have thought (only vaguely) on man.* With respect to the races, one of my best chances of truth has been broken down from the impossibility of getting facts. I have a good speculative line, but a man must have entire credence in natural selection before he will even listen to it. *Psychologically I have done scarcely anything.* Unless, indeed, expression of countenance can be included, and on that subject I have collected a good many facts and speculated, but I do not suppose I shall ever publish, but it is an uncommonly curious subject."*

Darwin's problem was how to account for the various forms of life in nature, and in doing so he incidentally had to account for the species, man. This was not the object but rather one of the results of his inquiries. How can one misinterpret, for instance, this statement: "Therefore I cannot doubt that the theory of descent with modification embraces all the members of the same great class or kingdom. I believe that animals are descended from at most only four or five progenitors, and plants from an equal or lesser number."†

This puts man "in the same predicament with other animals," but does not call special attention to him for that or for any other reason.

It would not be true, however, to take Darwin's statement that he had thought "only vaguely" on man as literally true. He had always been interested in man. As early as 1838 he had begun making notes on expression, and the production of the "Expression of the Emotions" as well as the "Descent of Man" show that this interest was by no means slight. The value he put upon such study is expressed in the "Origin of Species" as follows: "In the future I see open fields for far more important researches. . . . . Much light will be thrown on the origin of man and his history."‡

In the introduction to the "Descent of Man" he says, "The nature of the following work will be best understood by a brief account of how it came to be written. During many years I collected notes on the origin of man, without any intention of publishing on the subject, but rather with the determination not to publish, as I thought that I should thus only add to the prejudices against my own views. It seemed to me sufficient to indicate in the first edition of my 'Origin of Species,' that by this work light would be thrown on the origin of man and his history; . . . ."

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*"Life and Letters," Vol. II. pp. 59-60. Italics mine.

†"Origin of Species," sixth ed., p. 500.

‡Sixth ed., p. 504.

While, then, we cannot say that Darwin had thought even in 1860 "only vaguely" about man, it is certain that his interest in man himself was biological rather than psychological. He seems never to have studied the mind *per se,* but, granted the evolution of man, the evolution of mind follows as a matter of course. The great theory of the evolution of life *forms* presupposes or carries with it that of *mental* structure. He seems never to have questioned this and seeks rather to show the manner of mental evolution than to enter into the deeper problem of the origin of consciousness. Indeed, in his chapter on instinct in the Origin of Species he distinctly states this. "I have nothing to do with the origin of mental powers," he says, "any more than I have to do with life itself. We are concerned only with the diversities of instinct and of the other mental faculties of animals of the same class." Sixth ed., p. 242.

The great gap between the mentality of the highest animal and that of man was one of the chief arguments, against the theory of natural selection, and one cannot help wondering, therefore, why psychology was not more seriously studied by Darwin than appears to have been the case.

Keeping in mind, then, his general attitude toward mental evolution, let us see how this greatest of all biologists answers the questions we set.

I. Did he treat mind as a variation that came in somewhere, or did he posit it from the first, synchronous with life? This question he never answers clearly, though, as one would expect, he seems to believe that it was evolved rather than it took its rise in life itself. "In what manner the mental powers were first *developed* in the lowest organisms," he says, "is as hopeless an inquiry as how life itself first originated. These are problems for the distant future, if they are ever to be solved by man."*

He avoids the whole question of the origin or even the beginnings of consciousness and starting with instinct he answers our second question in the affirmative. Most decidedly does he believe that mind, like structure, was acted upon by unchanging laws and acquired its present state only after passing through many stages of slight modifications. In all three of the books quoted we find references that show his views upon this point quite clearly. The following are selected from many similar statements:

"Psychology will be securely based on the foundation already well laid by Mr. Herbert Spencer, *that of the necessary acquirement of each mental power and capacity by gradation."*†

"Nothing at first can appear more difficult to believe than that the more complex organs and *instincts* have been perfected, not by means superior to, though analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor. Nevertheless, this difficulty, though appearing to our imagination insuperably great, can not be considered real if we admit the following propositions, namely, that all parts of the organization and *instincts* offer, at least, individual differences—that there is a struggle for existence leading to the preservation of profitable deviations of structure or *instinct*—and, lastly, that gradations in the state of perfection of each organ may have existed, each good of its kind."‡

"When we no longer look at an organic being as a savage looks at a ship, as something wholly beyond his comprehension; when we regard every production of nature as one which has had a long history; when we contemplate every complex structure and *instinct* as the summing up of many contrivances, each useful to the possessor, in the same way as any great mechanical invention is the summing up of the labor, the experience, the reason, and even the blunders of numerous workmen; when we thus view each organic being, how far more interesting—I speak from experience—does the study of natural history become!"**

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*"Descent of Man," p. 64. Italics mine.
†"Origin of Species." p. 504. Italics mine.
‡Ibid., p. 476. Italics mine.
**Ibid., p. 502. Italics mine.

"Glancing at instincts, marvelous as some are, they offer no greater difficulty than do corporeal structures on the theory of natural selection of successive, slight, but profitable modifications. We can understand why nature moves by graduated steps in endowing different animals of the same class with their several *instincts.*"*

"Thus, as I believe, the most wonderful of all known *instincts,* that of the hive-bee, can be explained by *natural selection having taken advantage of numerous, successive, slight, modifications of simpler instincts; natural selection, having by slow degrees, more and more perfectly led the bees to sweep equal spheres at a given distance from each other in a double layer, and to build up and excavate the wax along the planes of intersection;* the bees, *of course,* no more knowing that they swept their spheres at one particular distance from each other than they know what are the several angles of the hexagonal prisms and of the basal rhombic plates; the motive power of the process of natural selection having been the construction of cells of due strength and of the proper size and shape for the larvae, this being effected with the greatest possible economy of labor and wax; that individual swarm which thus made the best cells with least labor and least waste of honey in the secretion of wax, having succeeded best, and having transmitted their newly-acquired economical *instincts* to new swarms, which in turn will have had the best chance of succeeding in the struggle for existence."†

"Under changed conditions of life, it is at least possible that *slight modifications of instinct might be profitable to a species; and if it can be shown that instincts do vary ever so little, then I can see no difficulty in natural selection preserving and continually accumulating variations of instinct to any extent that was profitable. It is thus I believe that all the most complex instincts have originated.* As modifications of corporeal structure arise from, and are increased by use or habit, and are diminished or lost by disuse, so I do not doubt it has been with *instincts.* But I believe that the effects of habit are in many cases of subordinate importance to the effects of the natural selection of what may be called *spontaneous variations of instincts*—that is of variations produced by the same unknown causes which produce slight deviations of bodily structure."‡

"If no organic being excepting man had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we should never have been able to convince ourselves that our high faculties had been gradually developed."**

That the evolution of mind is not always in the line of ascent is clear from the following: "Although the first dawnings of intelligence, according to Mr. Herbert Spencer, have been developed through the multiplication of co-ordination or reflex actions, and although many of the simpler instincts graduate into reflex actions, and can hardly be distinguished from them, as in the case of young animals sucking, yet the more complex instincts seem to have originated independently of intelligence. I am, however, very far from wishing to deny that instinctive actions may lose their fixed and untaught character, and be replaced by others performed by the aid of free will. On the other hand, some intelligent actions, after being performed during several generations, become converted into instincts and are inherited, as when birds on oceanic islands learn to avoid man. These actions may then be said to be degraded in character, for they are no longer performed through reason or from experience."††

"I have thought this digression worth giving, because we may easily underrate the mental powers of the higher animals, and especially of man, when we

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*Ibid., p. 490. Italics mine.
†Ibid., p. 268. Italics mine.
‡Ibid., p. 224. Italics mine.
**"Descent of Man," p. 63.
††"Descent of Man," p. 65.

compare their actions founded on the meaning of past events, on foresight, reason, and imagination, with exactly similar actions instinctively performed by the lower animals; *in this latter case the capacity of performing such actions has been gained step by step through the variability of the mental organs and natural selection, without any conscious intelligence on the part of the animal during each successive generation."**

Such statements as the above make one doubt sometimes whether Darwin regarded instinct, or at least a certain kind of instinct, as a form of mind at all. He believes instinct to be either a degraded form of intelligence, as in the case of birds on oceanic islands learning to avoid man, in which case it might still presumably come under the head of consciousness; or as capacity acquired by variability and acted upon by natural selection without any conscious intelligence at all. Whether he regarded this second form of instinct as conscious or not, it is not to be doubted that Darwin in a general way thought of instinct as mind. In his chapter on instinct in the "Origin of Species," he distinctly says so: "We are concerned only with the diversities of *instinct* and of the other *mental faculties* in animals of the same class."†

Just what the steps are between instinct and intelligence or what the gradations may be that lead up to instinct we are not told, though the fact that there is a graduated system of some sort is often stated. In discussing the development of the mental and moral faculties he says: "Undoubtedly it would be interesting to trace the development of each separate faculty from the state in which it exists in the lower animals to that in which it exists in man; but neither my ability nor knowledge permits the attempt."‡

Curiously enough, though he regards some forms of instinct as degraded intelligence, yet he does not think that intelligence is the result of developed instinct. In a letter to Professor Asa Gray he writes, "The reviewer takes a strange view of instinct: he seems to regard intelligence as a developed instinct; which I believe to be wholly false. I suspect he has never much attended to instinct and the minds of animals, except perhaps by reading." How are we to reconcile this with the statement quoted above? "I am, however, very far from wishing to deny that instinctive actions may lose their fixed and intaught character, and be replaced by others performed by aid of free will."**

But how intelligence, using the word in the sense of a higher form of consciousness arose is nowhere stated, and had it not been for his contradictory statement one would have inferred that Darwin did think intelligence was developed instinct; for he devotes his study of the animal mind, pure and simple, to instinct; and then in his comparison of the mental powers of man and the lower animals makes many statements like the following: "If no organic being excepting man had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we should never have been able to convince ourselves that our high faculties had been gradually developed. But it can be shown that there is no fundamental difference of this kind. We must also admit that there is a much wider interval in mental power between one of the lowest fishes, as a lamprey or lanclet and one of the high apes, than between an ape and man; yet this interval is filled up by numberless gradations. ..... My object in this chapter is to show that there is no fundamental difference between man and the higher mammals in their mental faculties. ..... With respect to animals very low in the scale, I shall give some additional facts under Sexual Selection, showing that their mental powers are much higher than might have been expected."††

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*Ibid., p. 66. Italics mine.
†P. 242. Italics mine.
‡"Descent of Man," p. 125.
**"Life and Letters," Vol. II. p. 99.
††"Descent of Man," p. 63-64.

Perhaps nowhere does he answer our question more clearly than in a letter to Lyell, October 11, 1859: "As far as I understand your remarks and illustrations, you doubt the possibility of gradations of intellectual powers. Now, it seems to me, looking to existing animals alone, that we have a very fine gradation in the intellectual powers of the Vertebrata, and one rather wide gap (not half so wide as in many cases of corporeal structure), between say a Hottentot and an ourang, even if civilized as much mentally as the dog has been from the wolf. I suppose that you do not doubt that the intellectual powers are as important for the welfare of each being as corporeal structure; if so, I can see no difficulty in the most intellectual individuals of a species being continually selected; and the intellect of the new species thus improved, aided probably by effects of mental exercise. I look at this process as now going on with the races of man, the less intellectual races being exterminated.....

"If I understand you, the turning point in our difference must be that you think it impossible that the intellectual powers of a species should be much improved by the continued natural selection of the most intellectual individuals. To show how minds graduate, just reflect how impossible every one has yet found it to define the difference in mind of men and the lower animals; the latter seem to have the very same attributes in a much lower stage of perfection than the lowest savage. I would give absolutely nothing for the theory of natural selection, if it requires miraculous additions at any one stage of its descent."*

With the feeling that Darwin's conception of mind was that of the ordinary man rather than that of the man of science, but that in so far as he understood mind at all, he believed in its gradual evolution, let us pass to the third question:

If Darwin did believe in the evolution of mind did he attempt to show any connection between changing bodily structure and function and mentality? The answer to this is, "Yes." But further than that we cannot go, that is, we cannot say whether the change in bodily structure caused or carried with it change in mentality or whether intellectual development led to the modification of the body. The fact is that Darwin thought changes in both were of value and that either was subject to variation, and that if one changed the other changed also. In his general summary at the end of the "Descent" he writes: "He, who admits the principle of sexual selection will be led to the remarkable conclusion that the nervous system not only regulates most of the existing functions of the body, but has indirectly influenced the progressive development of various bodily structures and *of certain mental qualities.* Courage, pugnacity, perserverence, strength and size of body, weapons of all kinds, musical organs, both vocal and instrumental, bright colors and ornamental appendages, have all been indirectly gained by the one sex or the other, through the exertion of choice, the influence of love and jealousy, and the appreciation of the beautiful in sound, color or form; *and these powers of the mind manifestly depend on the development of the brain.*"†

This instance clearly shows that development of mind cannot take place without development of brain. "These several inventions by which man in the rudest state has become so pre-eminent, are the direct results of the development of the powers of observation, memory, curiosity, imigination, and reason. I cannot, therefore, understand how it is that Mr. Wallace maintains that "natural selection" could only have endowed the savage with a brain a little superior to that of an ape."‡

Here again is an implicit statement of the connection between the evolution of mind and that of brain. It becomes explicit in the following: "As the various mental faculities gradually developed themselves the brain would almost cer-

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*"Life and Letters," Vol. II., pp. 6-7.

†"Descent of Man," p. 611. Italics mine.

‡Ibid., p. 47.

tainly become larger. No one, I presume, doubts that the large proportion which the size of a man's brain bears to his body, compared to the same proportion in the gorilla or orang, is closely connected with his higher mental faculties."*

Here the implication seems to be that the size of the brain (bodily structure) is dependent upon mental variation acted upon by natural selection. "To maintain, independently of any direct evidence, that no animal during the course of ages has progressed in intellect or other mental faculties is tc beg the whole queston the evolution of species. We have seen that, according to Lartet, existing mammals belonging to several orders have larger brains than their ancient tertiary prototypes."†

"As the voice was used more and more, the vocal organs would have been strengthened and perfected through the principle of the inherited effects of use; and this would have reacted on the power of speech. *But the relation between the continued use of language and the development of the brain,* has no doubt been far more important."‡

These examples show clearly that Darwin thought there was a connection between the gradual evolution of mind and that of body.

This brings us now to the fourth and last question:

What was the nature of this connection? On this point we cannot be sure. It has necessarily been partially answered in the examples given. Evidently, however, Darwin believed that both mind and body evolved. His lack of knowledge of psychology makes him indefinite. He nowhere defines mind. He implies that it is different in kind from body, and he certainly has materialistic tendencies. In evolution now mind leads, now body. He sometimes speaks as if, so far as survival value is concerned, it is sometimes due to a variation in mind that a species is preserved, and sometimes it is rather due to bodily structure, almost as if the two were in a way opposed, though he often as in the instances above given implies progressive development to be due to correlated change in mind and body, implying at the same time interaction between the two. Perhaps the "Expression of the Emotion in Men and Animals" best shows his views on this point, Darwin uses the terms 'brain' and 'mind' very loosely, making it still more difficult to get at his exact meaning; however, the action and reaction of mind and body is evident in these statements: "The great physiologist, Claude Bernard, has shown how the least excitement of a sensitive nerve reacts on the heart; even when a nerve is touched so slightly that no pain can possibly be felt by the animal under experiment. Hence when the mind is strongly excited, we might expect that it would instantly effect in a direct manner the heart; and this is universally acknowledged and felt to be the case. Claude Bernard also repeatedly insists, and this deserves especial notice, that when the heart is affected it reacts on the brain; and the state of the brain again reacts through the pneumogastric nerve on the heart; so that under any excitement there will be much mutual action and reaction between these, the two most important organs of the body."**

"The cause of perspiration bursting forth in these cases is quite obscure; but it is thought by some physiologists to be connected with the failing power of capillary circulation; and we know that the vaso—motor system, which regulates the capillary circulation, is much influenced by the mind."††

"When a person is much ashamed or very shy, and blushes intensely, his heart beats rapidly and his breathing is disturbed. This can hardly fail to affect the circulation of the blood within the brain, and perhaps the mental powers."‡‡

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*Ibid., p. 52.
†Ibid., p. 78.
‡Ibid., p. 85.
**"Expression of the Emotions in Man and Animals," pp. 68-69.
††Ibid., p. 73.
‡‡Ibid., p. 325.

"If, then, there exists, as cannot be doubted, an intimate sympathy between capillary circulation in that part of the brain on which our mental powers depend, and in the skin of the face, it is not surprising that the moral causes which induce intense blushing should likewise induce independently of their own disturbing influence, much confusion of mind."*

The above citations refer to the interaction of mind and body in the development of the individual. One finds, as would be expected, the same theory when it is a question of phylogenesis or evolution. As the voice was used more and more, the vocal organs would have been strengthened and perfected through the principle of the inherited effects of use; and this would have reacted on the power of speech. But the relation between the continued use of language and the development of the brain, has no doubt been far more important. The mental powers in some early progenitor of man must have been more highly developed than in any existing ape, before even the most imperfect form of speech could have come into use; but we may confidently believe that the continued use and advancement of this power would have reacted on the mind itself, by enabling it and encouraging it to carry on long trains of thought."†

"There is no more improbability in the continued use of the mental and vocal organs leading to inherited changes in their structure and functions than in the case of hand-writing, which depends partly on the form of the hand and partly on the disposition of the mind; and hand-writing is certainly inherited."‡

To sum up, Darwin seems to think that mind itself was evolved, but does not attempt to give the conditions of its origin. He believes that mind and matter differ in kind; but that both are subject to the same laws: variation, heredity, natural selection. Each has reached its present state in man and animals through a long series of gradual changes. These changes in mind he does not trace. There is a connection between the two series: change in structure affects mind, and mind in its turn acts upon body. On the whole, mental evolution has been progressive: "Our high faculties have been gradually developed."

Romanes followed Darwin with three books which purported to be strictly psychological in character: "Animal Intelligence," "Mental Evolution in Animals," and "Mental Evolution in Man." Romanes was not an independent thinker: his books are made up largely from quotations of psychologists and philosophers, and it is surely not going beyond the facts to say that he added nothing to what was already known concerning mental evolution, nor did he advance anything that proved of value. Possibly because the subject upon which he wrote was interesting and because he himself was a friend of Darwin, his books have been widely read, and are on that account at least deserving of mention.

In the first place Romanes takes the theory of evolution for granted. He says: "Therefore I submit that if the hypothesis of mental evolution be granted, and if all the matters of observable fact which the diagrams ** serves to express are eliminated, comparatively little in the way of deductive reasoning is left: and of this little most follows as necessary consequence from the original hypothesis of mental evolution having taken place. Of course any one who does not already accept the theory of evolution in its entirety, may object that I am thus escaping from the charge of speculation only by assuming the truth of that which grants me all that I require. To this I answer that as far as the evidence of Mental Evolution, considered as a fact, is open to the charge of being speculative. I must leave the objector to lodge his objection against Mr. Darwin's "Origin of Species" and "Descent of Man." "I shall be abundantly satisfied with my own work if, taking the process of Mental Evolution as conceded, I can make it clear that the

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*Ibid., p. 326.

†"Descent of Man," p. 85.

‡Ibid., p. 86.

**A schematic map showing the stages of the probable development of mind.

main outlines of its history may be determined without any considerable amount of speculation, as distinguished from deduction following by way of necessary consequence from original hypothesis."*

In his introduction to this work he is even more specific: I take it for granted, then, that all my readers accept the doctrine of Organic Evolution, or the belief that all species of plants and animals have had a derivative mode of origin by way of natural descent; and, moreover, that one great law or method of the process has been natural selection, or survival of the fittest. If anyone grants this much, I further assume that he must concede to me the *fact,* as distinguished from the *manner* and *history* of Mental Evolution, throughout the whole range of the animal kingdom, with the exception of man. [In "Mental Evolution in Man" he withdrew this exception.] I assume this because I hold that if the doctrine of Organic Evolution is accepted, it carries with it *as a necessary corollary* [Italics mine] the doctrine of Mental Evolution, at all events as far as the brute creation is concerned. For throughout the brute creation, from wholly unintelligent animals to the most highly intelligent, we can trace one continuous gradation; so that if we already believe that all specific forms of animal life have had a derivative origin, we cannot refuse to believe that all the mental faculties which these various forms present must likewise have had a derivative origin. And, as a matter of fact, we do not find anyone so unreasonable as to maintain or even to suggest, that if evidence of Organic Evolution is accepted, the evidence of Mental Evolution, within the limits I have named, can consistently be rejected. The one body of evidence therefore serves as a pedestal to the other, such that in the absence of the former the latter would have no *locus standi* (for no one could well dream of Mental Evolution were it not for the evidence of Organic Evolution, or of the transmutation of species); while the presence of the former irresistibly suggests the necessity of the latter, as the logical structure for the support of which the pedestal is what it is."†

All of these logical deductions might be boiled down into: If body develops, of course mind does.

Did Romanes posit mind as synchronous with life? The answer seems to be, "No." He believes that mind came in somewhere, and as nearly as one can determine makes it a form or modification or variation of matter. "For, whatever views one may entertain concerning the relation of Body and Mind, there can be no question, on the basis of the evolution theory which I assume, that, as a matter of historical sequence, the principles of physiology were prior to those of psychology; and therefore, if in accordance with our original agreement we allow that the latter have a physical basis in the former, it follows that the principles of psychology, which now constitute the objective basis of choice, whatever they may be, probably came into operation long before they were sufficiently evolved thus to constitute the foundation of psychology."‡

Professor J. M. Baldwin thus describes Romanes' position: "Romanes thinks it is best to draw no line at all between life without and life with consciousness, but to say that as we descend in the scale terms like feeling, which imply consciousness, are gradually eviscerated of their meaning, and he is probably right. But he does not see that even then there are two remaining alternatives."**

Romanes sums up and criticizes his own statements in a way that shows he understands the inadequacy of his own definitions. He seemed to think however they were the best possible definitions. "If we turn from the ascending scale of mental faculties in man, to the ascending scale of mind in the animal kingdom, we shall meet with further and still more definite evidence that the distinguishing

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*"Mental Evolution in Animals," p. 68.

†Ibid., p. 8.

‡"Mental Evolution in Animals," p. 48.

**"Mental Development in the Child and the Race." 2nd ed., p. 212.

property of mind, on its physiological side, consists in this power of discriminating between different kinds of stimuli, irrespective of their degrees of mechanical intensity. But, before giving a brief review of the evidence on this point, I may here meet a difficulty which has already arisen. The difficulty is that I began by showing it necessary to define Mind as the power of exercising choice, and then proceeded to define the latter as a power belonging only to agents that are able to feel. Yet on looking at the objective side of the problem, I pointed out that the physiological or objective equivalent of choice is found to occur in its simplest manifestations at least as low down as the insectivirous plants, which are certainly not agents capable, in any proper sense, of the term of feeling. Therefore it seems that my conception of what constitutes choice is in antagonism with my view that the essential element of choice is found to occur among organisms which cannot properly be supposed to feel. And this antagonism, or inherent contradiction is a real one, though I hold it to be unavoidable. *For it arises from the fact that neither Feeling nor Choice appears upon the scene of life suddenly. We cannot say, within extensive limits, where either can properly be said to begin. They both dawn gradually,* and therefore in our everyday use of the terms we do not wait to consider where they are first applicable; we only apply them when we see their applicability to be apparent. But when we endeavor to use these same terms in strict psychological analysis, we are at once met with the difficulty of drawing the line where the terms are applicable and where they are not. There are two ways of meeting the difficulty. One is to draw an arbitrary line, and the other is not to draw any line at all; but to carry the terms down through the whole gradation of things until we arrive at terminal or root principles. By the time that we do arrive at these root principles, it is no doubt true that our terms have lost all their original meaning; so that we might as well call an acorn an oak, or an egg a chick, as speak of a Dionoea feeling a fly, or a Drosera *choosing* to close upon its prey."*

While Darwin is an interactionist, Romanes, wherever he does not leave the question unsettled, is in his ultimate analysis a monist. Many passages read as if he were a parallelist. He seems to make bodily structure the *condition* of mentality.

"We have already taken it for granted that Mind has a physical basis in the functions of the nervous system, or that every mental process has a corresponding equivalent in some neural process. I shall next endeavor to show how precise this equivalency is."†

In showing what it is, he falls into such expressions as the following, which seem to imply a closer connection: "The most fundamental principle of mental operation is that of memory, for this is the *condition sine qua non* of all mental life. But memory *on its obverse* side [italics mine], or the side of physiology, can only mean that a nervous discharge, having once taken place along a certain route, leaves behind it a molecular change, more or less permanent, such that when another discharge afterwards proceeds along the same route, it finds, as it were, the footprints of its predecessor."‡

Though he tries to avoid the question of the deeper relation between mind and body in his psychological books, stating that the fact that "it is enough if we are agreed that every psychical change of which we have any experience is invariably associated with a definite physical change, whatever we may suppose to be the nature and significance of this association."**

Yet that the separation of the two is not easy for him is shown by this footnote: "it seems almost needless to add that the impossibility of entirely separating psychology from physiology for the purposes of exposition will, *mutatis*

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*"Mental Evolution in Animals," pp. 53-64. Italics mine.
†"Mental Evolution in Animals," p. 34.
‡Ibid., p. 35.
**Ibid., p. 47.

mutandis, continue to meet us more or less throughout the following, as it has throughout the preceding chapters; but I shall endeavor always to make it clear when I am speaking of mental processes and when of physical."*

Romanes had a logical system of mental evolution which he worked out mainly from the ideational psychology of James Mill. This beginning with different forms of precept worked its way up through recepts—a term which he coined—and concepts till it culminated in association of ideas. To build up this logical system he utilized whatever he could find in the literature of biology, psychology and philosophy; but this pre-disposition to a theory in and for itself was most damaging in its results. Mental evolution means something more than logical analysis.

Romanes, then, left the problem where Darwin had. To be sure he tried to solve what Darwin had thought almost impossible. He defined mind, but allowed it gradually to lose its significance as it descended in the scale. He vaguely accounted for the origin of consciousness in terms of physiology. He emphasized —and perhaps this was the most scientific phase of his work—that there could be no psychosis without neurosis, that mind as we know it is always supported or has for its "root-principle" body, and that in its evolution, body must evolve correspondingly. Mind does not act upon body but owes its very existence to body, does not appear until bodily structure has attained a certain development.

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*Ibid., p. 71.

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